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UNITED STATES PATENT AND TRADEMARK OFFICE

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BEFORE THE BOARD OF PATENT APPEALS  
AND INTERFERENCES

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*Ex parte* STEVE BARHORST,  
JOSEPH BUNDY, and DARYL DUNCAN

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Appeal 2009-005360  
Application 10/804,913  
Technology Center 1700

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Decided: March 29, 2010

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Before EDWARD C. KIMLIN, BRADLEY R. GARRIS, and  
ADRIENE LEPIANE HANLON, *Administrative Patent Judges*.

GARRIS, *Administrative Patent Judge*.

DECISION ON APPEAL

Appellants appeal under 35 U.S.C. § 134 from the Examiner's decision rejecting claims 1-3 and 37-41. We have jurisdiction under 35 U.S.C. § 6.

We AFFIRM-IN-PART.

Appellants claim a method for gas-metal arc welding of ferrous alloys comprising the steps of feeding a consumable metal-core electrode having a sheath and a core into a gas-metal arc welding apparatus, using Ar to form a non-oxidizing shielding atmosphere around the electrode, and igniting an arc to thereby weld a work piece in the non-oxidizing shielding gas atmosphere (claim 1).

The appealed claims read as follows:

1. A method for gas-metal arc welding of ferrous alloys comprising:

feeding a consumable metal-core electrode into a gas-metal arc welding apparatus, the metal-core electrode having a sheath and a core characterized by a core composition;

using Ar to form a non-oxidizing shielding atmosphere around the consumable metal-core electrode; and

igniting an arc between a ferrous alloy work piece and the consumable metal-core electrode to weld a carbon steel, low alloy steel or ferritic stainless steel work piece in the non-oxidizing shielding gas atmosphere.

2. The method of Claim 1, wherein the non-oxidizing atmosphere of Ar comprises less than 1 % of a residual amount of N<sub>2</sub>, N<sub>2</sub>O<sub>5</sub>, O<sub>2</sub> or CO<sub>2</sub>.

3. The method of Claim 1, wherein the core comprises up to 45% wt of a metal powder and wherein an iron powder comprises up to 44% wt of the core composition.

37. The method of Claim 1 further comprising producing a weld metal comprising a percentage of oxygen in the weld metal not exceeding 0.06% wt.

38. The method of Claim 37, wherein the core composition of

the metal-core wire comprises oxygen.

39. The method of Claim 1, in which a fume generation rate does not exceed 0.25 gms/min.

40. The method of Claim 1, wherein stability of the arc is characterized by a standard deviation within the range from about 0.2 V to about 0.3 V.

41. The method of Claim 1, wherein a toughness of a weld metal at 0[°]F of at least about 50 ft-lb at 0° F and at least about 41 ft-lb at - 20° F.

The references set forth below are relied upon by the Examiner as evidence of obviousness:

Church	4,463,243	Jul. 31, 1984
Marshall	4,800,131	Jan. 24, 1989
Gault	6,303,891 B1	Oct. 16, 2001

The Examiner rejects claims 1-3 under 35 U.S.C. §103(a) as being unpatentable over Gault in view of Marshall, and correspondingly rejects claims 37-41 over these references and further in view of Church.

The Rejection of claims 1-3 over Gault and Marshall

The Examiner concludes that it would have been obvious for an artisan to provide Gault with an electrode having a sheath and core of the type required by the rejected claims in view of Marshall (Ans. 5).

Appellants argue that the rejection of claim 1 is improper because the concentration of oxidizers in Gault's shielding atmosphere is much higher than permitted by the claim phrase "non-oxidizing shielding atmosphere" (Br. para. bridging 4-5). As support for this argument, Appellants state that, "[a]s defined by Applicants in the specification, the term 'non-oxidizing' means that the shielding gas is either a pure noble gas having a

commercially available degree of purity, or a shielding noble gas with the remaining concentration of oxidizers less than 1% (Paragraph [0008])” (*id.*).

This argument is unpersuasive because, contrary to Appellants’ above-quoted statement, nothing in paragraph [0008] of the Specification defines the term “non-oxidizing” as requiring a concentration of oxidizers less than 1%. In fact, this paragraph does not even contain the term “non-oxidizing”. Furthermore, Appellants’ argument is contradicted by other portions of their disclosure which evince that the term “non-oxidizing” encompasses oxidizer concentrations above the “less than 1%” (*id.*) range urged by Appellants. For example, as properly indicated by the Examiner (Ans. 7), appealed claim 2 encompasses a non-oxidizing atmosphere containing 0.99% O<sub>2</sub> and 0.99% CO<sub>2</sub> which yields a total oxidizer concentration of 1.98%. (*See also* Table 15 and Spec. 12, first full para.).

As for claim 2, Appellants point out that the claim requires the non-oxidizing atmosphere to comprise less than 1% of a residual amount of N<sub>2</sub>, N<sub>2</sub>O<sub>5</sub>, O<sub>2</sub> or CO<sub>2</sub> and argue that the Abstract and Table 1 of Gault disclose oxidizer concentrations higher than permitted by this claim (Br. 5).

However, the Examiner correctly explains that the alternative term “or” in claim 2 renders the claim satisfied if the shielding atmosphere of Gault contains less than 1% of any single one of the gases recited in claim 2 (Ans. 7). As further explained by the Examiner, it is undisputed in this record that Gault’s shielding atmosphere contains no nitrogen (*id.*) and accordingly satisfies one of the several alternative embodiments encompassed by claim 2. In addition, we point out that Table 1 of Gault discloses a shielding atmosphere which contains no carbon dioxide (col. 1, l.

65), thereby satisfying another of the several alternative embodiments embraced by this claim.

With regard to claim 3, Appellants argue that none of Marshall's examples 1-6 discloses an electrode core comprising up to 44% iron powder of the core composition as required by this claim (Br. 6-7).

However, the issue before us is not whether Marshall expressly discloses this claim 3 feature. Instead, the issue is whether this feature would have been suggested by Marshall and therefore obvious within the meaning of § 103. With this in mind, we find that Marshall teaches a core wire (i.e., an electrode core) which may be a solid metallic wire, a metallic powder and/or flux cored wire (col. 2, ll. 8-9). Marshall further teaches that these wires may contain iron (Exs. 1, 5). In light of these teachings, it would have been obvious for an artisan to provide Gault with an electrode having a sheath and a core wherein the core comprises iron powder. Moreover, an artisan would have recognized the amount of such iron powder to be a result-effective variable and therefore would have found it obvious to develop through routine experimentation workable or optimized amounts of this iron powder to thereby achieve a concentration within the range required by claim 3. *See In re Boesch*, 617 F.2d 272, 276 (CCPA 1980) (discovery of an optimum value for a result-effective variable in a known process is ordinarily within the skill of the art).

For the above-stated reasons, we sustain the Examiner's § 103 rejection of claims 1-3 as being unpatentable over Gault in view of Marshall.

The Rejection of Claims 37-41 over Gault, Marshall, and Church

The Examiner's rationale for rejecting these claims is set forth below:

Church discloses using shielding gas having oxygen content between 0.1 to 1% (col. 7, line 62 - col. 8, line 17) for the purpose of permitting smaller diameter wires to carry higher current densities. In addition, Church discloses specific gas mixtures are varied with metal or metal alloys being welded (col. 8, lines 15-17).

Therefore, it would have been obvious to one of ordinary skill in the art at the time the applicant's invention was made to have oxygen content less than 0.06%, since this would depend on the metals to be welded. Furthermore, it would have been obvious to have fume generation not exceeding 0.25 gms/min, arc with standard deviation of 0.2V to 0.3 V, and toughness of weld at 0[°] F at least 50ft-lb and 41 ft-lb at -20[°] F, since based on Church's disclosure that gas mixture will depend on the metal or metal alloys.

(Ans. 5-6).

Appellants correctly point out that the Church disclosure cited by the Examiner relates to the oxygen content of the shielding gas whereas claim 37 (and concomitantly its dependent claim 38) defines the amount of oxygen permitted in the weld metal (Br. 7). Appellants argue that the cited portion of Church is irrelevant to claim 37 (*id.*). Similarly, Appellants argue that Church's gas mixture disclosure would not have suggested the fume generation rate, the arc stability and the weld metal toughness respectively required by claims 39, 40, and 41 (Br. 8).

We have carefully reviewed the Examiner's response to these arguments (Ans. 10-12). However, in both the rejection of claims 37-41 and the response to arguments concerning these claims, the Examiner has failed to articulate reasoning with some rational underpinning to support a conclusion of obviousness. *See In re Kahn*, 441 F.3d 977, 988 (Fed. Cir. 2006) ("[R]ejections on obviousness cannot be sustained by mere conclusory statements; instead, there must be some articulated reasoning with some

rational underpinning to support the legal conclusion of obviousness”). The Examiner has identified nothing in Church or the other applied references which evinces that the features defined by the rejected claims are known in the prior art as desirable or as result-effective parameters such that it would have been obvious for an artisan to provide Gault with these claim features. These circumstances reflect that the Examiner’s obviousness conclusion is inappropriately based on mere conclusory statements.

It follows that we cannot sustain the Examiner’s § 103 rejection of claims 37-41 as being unpatentable over Gault, Marshall, and Church.

#### Conclusion

The decision of the Examiner is affirmed-in-part.

No time period for taking any subsequent action in connection with this appeal may be extended under 37 C.F.R. § 1.136(a) (2008).

#### AFFIRMED-IN-PART

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